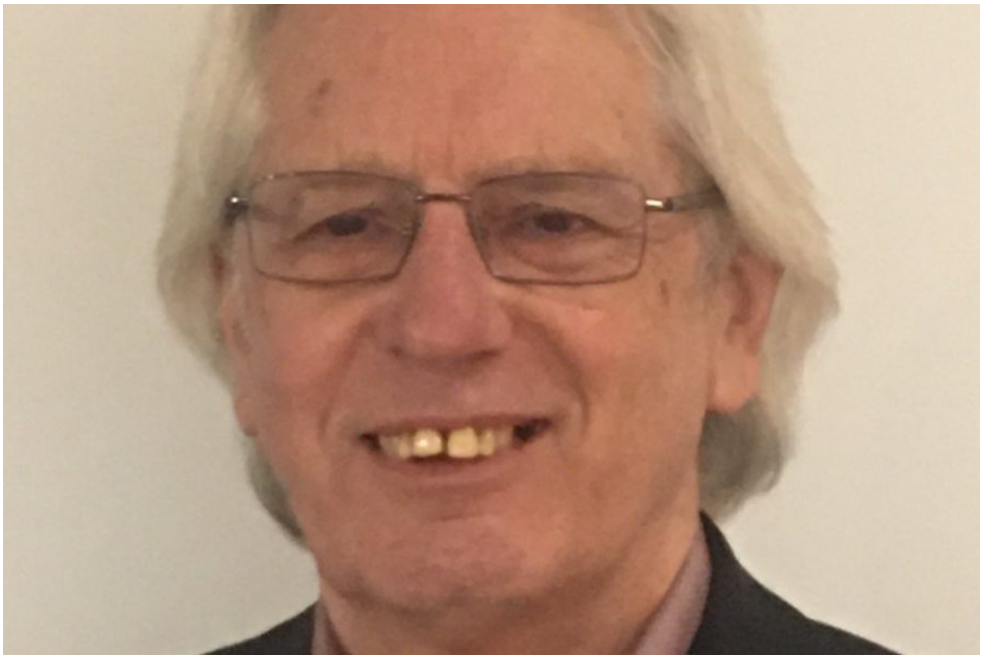
FutureHorizons
The Global Semiconductor Industry Analysts

Future Horizons Ltd
Blakes Green Cottage
TN15 0LQ, UK
Tel: +44 1732 740440
Fax: +44 1732 608045
mail@futurehorizons.com
www.futurehorizons.com

Research Brief: 2022/05 – Archives Of IT

Interview With Malcolm Penn



Abstract of the Archives of IT Interview with Malcolm Penn, Future Horizons' Founder & CEO, in February 2022 by Richard Sharpe. Visit Future Horizons Website for the full video interview.

Malcolm Penn was born in 1944 in Worcester Park, Surrey. His father worked for one of the supply companies building mechanical parts for aeroplanes made by Vickers for the war effort. Malcolm says: "He was a very good machinist, what was called a centre lathe turner, making all these intricate parts out of metal. He ground them down and cut them to very high precision because everything was pretty much hand-made back then on all of these mechanical items." Malcolm's mom was a cleaning lady working in people's private homes. Malcolm has an older sister.

He describes how his family were lucky enough to have a radio and wind up gramaphone and how his father turned a surplus army radar set into a TV, saying: "We were lucky, I had a TV set, a little six-inch round green tube which was not exactly the best way to watch TV, but we were the only kids in the street that had TV, so, I was popular."

He says he inherited his father's work ethic, focus on family and his generosity to help anyone. He adds: "He was incredibly generous and kind-hearted, he could always see the good in

anybody. I could always bring anybody back home at any time and that was a wonderful experience, it opened my heart to generosity which I think is very important in living an unselfish and fulfilling life."

Education

Malcolm attended Tolworth County Primary School and says his parents encouraged their children's education. He says: "My father was very much a mechanical engineering-type of person, and he saw education as a way to a better future."

Having passed his eleven-plus, Malcolm went to Surbiton County Grammar School where he studied for a wide range of O levels including maths, English, physics, chemistry, biology, geography, history, and French. He followed on with A levels in pure maths, applied maths and physics, alongside another O level, this time in German.

Malcolm also joined the Air Training Cadet Force on the basis that if he had to complete National Service after school, it would give him the option of joining the RAF. As things turned out, National Service was scrapped prior to Malcolm coming of age.

His other interest at school was music which led to him playing in bands and becoming his 'parallel career' as he describes it. He graduated from skiffle to pop bands and won the Battle of Bands in Surbiton, he says: "It was as I was finishing my senior school, I was in a band in London which was actually professional. I managed to keep my school work, my day job, and my music together because most of the music was London-based back then."

Borough Polytechnic (Southbank University)

Malcolm applied to Borough Polytechnic, now the Southbank University, in London, to study for a BSc in Electronic Engineering. He says of the decision: "I like taking things apart, my dad was, he was always fixing things. The first thing that we did when he bought something new was take it apart, much to the horror of my mother who saw this brand-new piece of equipment suddenly in pieces on the kitchen table, but I enjoyed that. I like electrical stuff, I was beginning to get involved a little bit in electronics, although it was terribly primitive, with valves and stuff. Electronics was interesting because the transistor was just about there and the first transistor radios were there, but we never believed that they were real. We always thought, how can anything that tiny actually work, it must be a confidence trick, it's all a big con."

The course was a four-year sandwich course which involved six months of study and six months working in industry throughout the duration of the course. Malcolm spent the first two years of his working experience at Vickers which allowed him to maintain his interest in aeroplanes. He says: "In the first year at Vickers Weybridge, I was basically doing a short circuit of their apprenticeship course, we started off in the machine labs making things out of lumps of metal, we learned a lot of other kinds of elementary mechanical-type skills, learning how to do design, doing a few drawings and stuff like that. The second year was in Wisley working with the groups that were fitting out and finishing the aeroplanes before they were delivered to a

customer. They could only just fly when they left Weybridge site, they had only systems in them that would just simply take them across the railway line. I ended up wiring the aeroplanes and doing all sorts of things towards the end. I was assigned to two people. I spent my lunch hour reading all the manuals, I wanted to figure out how things worked. I knew every solenoid, relay, pump, actuator, I knew it all off my heart. I knew the fuse numbers, I knew the whole thing and when something went wrong, I was the guy that said, 'you want to change fuse 602, it's in the underground hold next to the galley.' They looked at me and they gasped."

Malcolm tells the story of how he almost destroyed one of the VC-10 planes when he forgot about an experiment he had set up in the luggage hold. He says: "I leapt out of the hold and went off for my tea-break forgetting that I had left this liquid heating itself in the baggage hold. When I came back 20 minutes later, the whole of the inside of the aeroplane was covered in this white fumed smoke. Fortunately, I was saved by the fact it didn't catch fire."

Of his sandwich course experience, he says: "It was a good type of education because you have the academic work and the theoretical work, then you have the practical work and you were dealing with both alternately, but then applying the theory into the practice and the practice was tested on the theory. It was a sad thing when they stopped doing them because it really did give you breadth of insight and you were much more employable and at the end of it. They were incredibly valuable, marvellous for your work ethic, it gave you a much broader, view on life. I was working with real people in a real factory. It was eye-opening and character building to a really great extent."

Venner

The third year of his course was spent with Venner, based in New Malden and a,fter completing his degree, Malcolm found full-time employment there as an electronic design engineer. Venner's main business was parking meters and time switches. Malcolm says: "The whole shop floor was full of machines stamping out little brass discs to make up the timers.

It was quite visionary in a way because the owner figured that electronics would eventually destroy his timekeeping business, so, he set up a small electronics lab. There were only about 15 of us in the whole laboratory but it was quite visionary and they were making a lot of test equipment for the British Post Office (now called BT) at that time."

Malcolm's work saw him designing counter timers for the Post Office. He also built a clock for the QE2.

He adds: "I was building a few other bits and pieces and I started to demonstrate these to potential customers which was another eye-opening experience. It opened my eyes to a different part of the world, instead of being tied to a desk. The experience planted a little seed in me that there was more to life than being a designer, because quite frankly, I wasn't that good as a designer. The big challenge was that the designs had to work and my designs only worked after a lot of trouble. I wasn't a natural-born designer."

ITT semiconductors

In 1969, Malcolm took a role as product marketing engineer at ITT semiconductors. ITT was a conglomerate headed up by Harold Geneen. The UK organisation was based at an old STC valve factory in Foots Cray near Sidcup, Kent. It progressed into semiconductors based on the work it had done on silicon, germanium, and rectifiers. Malcolm says: "They started to make both small-signal transistors, and eventually integrated circuits because they had a technology exchange with Fairchild Semiconductor. We manufactured Fairchild's DTL range of integrated circuits and that led to the development of copying the TI Series, 74 Series-TTL circuits. That was done independently.

"I got the job as a product marketing engineer for TTL integrated circuits. I liked that because they were new and it was all pioneering stuff. That appealed to me, I didn't want to do anything that was established and boring, I always liked to do the stuff which was new and exciting and a bit more creative."

His new role saw Malcolm travel on sales visits to the US. He adds: "I was responsible for the TTL product line and as we were the worldwide centre for this particular product line, I was invited to join a sales meeting in the United States. I went over to explain to people what we were doing, the project plan and get them all psyched up to start selling to the market. The market was much more in the United States than it was in Europe or the UK. The real big market at that time was mainframe computers and telecommunication exchanges."

While ITT was not in the microprocessor business, they designed an electronic circuit for Servis washing machines in the mid-1970s, designed to replace the electro-mechanical programmer. It was reasonably successful and ITT bought the copyright from Servis to sell variations of it to other applicance companies. Malcolm adds: "It was really a pre-programmed device as opposed to a microprocessor which is programmable."

When Malcolm took it to the US, it was decided to call it a dedicated microprocessor in order to appeal to the large washing appliance manufacturers. Malcolm adds: "We converted an American washing machine with one of our ICs and tramped around the mid-west with it in the back of this estate car, wheeling it into GE and the other big appliance manufacturers, setting it up in their laboratory and plugging it in to show them their machine worked with our controller in it. It was awesome, it really was fun."

Having gained contracts with GE and Maytag, the project failed when the recession hit and the programme was cancelled.

Malcolm was promoted to UK Marketing Director in 1975 which saw him take over all of the products being made at Foots Cray. He says: "That is when we had started the memory programme; one of my programmes, starting with the 1103 1k DRAM. We became the worldwide centre from that which was being run out of New York, so, I had regular meetings at headquarters there because it was a very high-profile programme."

Malcolm went on to hold positions as the IC Test Manager, and Director of Special Operations. Malcolm explains: "I complained so much about the factory when I was marketing director, that they got so fed up with me, they said, 'Well, you do it then, if you think you can do any better'.

So, suddenly, I found myself on the other side of the fence in operations. The first job they put me in was final test. That is the worst job I have ever, ever, had in my life. It was awful, you were hated by everybody. It's a losing game and it was horrible, but I got it organised a bit better."

Having organised the testing department, Malcolm was then put into a firefighting role for the Director of Operations setting up a task force to sort out the operational side of the business. He says: "That was a bit more fun, I learned the other side of the fence which was a humbling experience. It's easy to moan about a factory not doing what you want them to do, but when you're on the other side of the fence you begin to realise the challenges associated with it."

Following his year as Director of Special Operations, Malcolm was sent to ITT's European Telecomms Systems Division, ITT Europe, headquartered in Brussels to work on System 1240; the world's first software-controlled electronic telephone switch. Malcolm says: "This was really quite advanced for its time, it used the most advanced microprocessors available and was completely software controlled."

The design was centred in the US and then sub-contracted to ITT's thirteen factories across Europe. Based on Malcolm's advanced electronics, semi-conductors and microprocessor experience, he was tasked with creating a programme to co-ordinate production from choice of materials, through to testing.

Malcolm adds: "I was challenged to setting up the system to bring these people together to agree on the fundamentals of component engineering, which microprocessor to standardise on, which microcontroller, which memory, etc. We had a very formal approval system which was all paper-driven and by the time you had written the spec it was out of date because the ICs had been revised five times and you were on to the next generation part.

It was anarchy in the purchasing departments; they wanted to buy from anybody. We had to put a stop to that and put in some very pragmatic procedures to create a degree of control. We introduced a concept of self-certification whereby the component suppliers' engineers self-approved themselves and showed to us the data which meant that these parts met the reliability criteria.

"It was quite radical at that time but it worked very well. At the end of two years, we had the purchasing and the engineering groups working incredibly well in harmony."

To bring these different cultures to work together harmoniously, Malcolm says he wore them down and got them talking to each other by focusing on the objective.

He says: "I tried to de-emotionalise it. I said: 'Here is what we're trying to do, how are we going to do it, what's the best way of doing that there? We need a microcontroller, we can't have ten, how do we whittle it down to the best compromise that we can all live with?' Then I made sure they didn't have enough funding to do it all themselves, they had to cooperate horizontally. They learned the benefit of trust and they learned that actually, if two of us are working on this, we can actually get the same amount of work done and more because one plus one really did equal more than two."

Dataquest

In 1982, Malcolm was invited to join Dataquest to help them open up a European research activity tapping into the European semiconductor industry and market.

He says: “I’ve known Dataquest from my ITT Semiconductor days, because when I was running the ITT memory group, I was a subscriber to Dataquest’s memory service which was really the heart of Dataquest at that time . I was a memory client of theirs using their reports, and then when I transferred to ITT Europe, I took the subscription across with me and became an end-user of the Dataquest material. It was a kind of gamekeeper turned poacher sort of relationship. I was looking at it from a purchasing point of view now, rather than a selling point of view.”

Despite being sceptical about the job in the beginning, Malcolm decided to accept, he adds: “In the end, I thought it’s worth a risk. If the worse comes to the worse, I can go back onto the other side of the fence. After I joined I discovered they had already pre-sold the subscription to 13 clients in Europe and they hadn’t got a single piece of paper written yet. They had sold the subscription on the promise of within two years, we’ll have the service up and running.”

Malcolm joined them nine months into that two-year cycle and took on the challenge of delivering on the promise Dataquest had made, he says: “Never one to decline a challenge, we got stuck in. I had an assistant and we started to build a database. The whole concept that Dataquest had at that time, was clients could phone in with questions, and I used to encourage that, most of the people in the US didn’t, they hated it, they considered it to be an interruption.

I liked it because I thought if you’ve got a question and I can find an answer to that, then I can make you happy and you’ll be a good client. It helped me build up a database; their questions became part of a database. Gradually, I pieced it all together and before the two years was up, we published the very first set of European database services. My 13 clients were deliriously happy and stayed with me throughout that whole time there and we built it into a very good service.”

Malcolm, working in an office in New Bond Street, London, reported into his manager based in Cupertino, California. He adds: “It was the ideal scenario. I had a boss in Cupertino, who let me do what I had to do, he didn’t interfere in the slightest, providing I delivered the reports, the newsletters and everything else, he left me alone. It was an incredible environment to actually be allowed to do one’s own thing.”

Future Horizons

In 1989, Malcolm left Dataquest and formed his own company, Future Horizons, of which he became CEO.

Management Style

On the subject of his management style, Malcolm highlights his first team management in 1973, when he was promoted to product marketing manager at ITT Semiconductors and was

responsible for a team of three. He says: “We were a good team, we all had our work to do. From the very early days, my management practice has always been to empower people, let them get on with their jobs, not expect me to tell them what to do. I never try to be an overbearing kind of manager so we got on quite well, it seemed to work out.”

On the subject of firing someone, Malcolm adds: “It’s never nice, but at some point in time they have to go if they’re not contributing. It’s unfair to keep them for the rest of the team. There is nothing more demoralising than a passenger being tolerated when everybody knows that they are incompetent and not doing the right job. So, you just have to be objective about it, be kind but factual and direct. Don’t linger on it, explain the reasons and get on with it. It should always be a very fast process, to a certain extent you have to get rid of them immediately, allow them to leave the premises and work off their notice at home.”

On Moore’s Law

Asked about Moore’s Law, Malcolm says: “It was a critical catalyst in bringing the industry together because life was getting more complicated. The industry had to be a lot more in line with each other because if they didn’t all come together at the same time it wouldn’t work. I think that Moore’s Law very rapidly became the conductor of an orchestra, bringing all the pieces together.

“It was a natural assumption for it to take on this role of being the heartbeat, and the two-year cycle that we associated with it turned out to be one that was practically realisable within the resources of the industry without putting in too much padding in there. It kept people on their toes, it was the heartbeat, it was like the drum major, out there in front, and keeping everybody coordinated and I think that has been its real value to the industry.

“Being able to double the complexity every two years is a given. That is what we’re able to do. It’s a very important observation, it took a certain degree of risk and analytical mind to say, do you know what this means, it means we can do this? That was quite visionary, but to actually then turn it into the orchestra leader, industry did that by its own accord and it became this is what we’ve got to do. We know in two years’ time, we’ve got to be here, let’s all march towards that goal. It became self-fulfilling.”

On the European Semiconductor Industry

Malcolm talks about the evolution of the European Semiconductor industry, saying: “When I grew up in the semiconductor industry, Europe was highly fragmented. Every single country had its own national champion, not only in the semiconductor field, but in the end-user application field. So, everyone had their own computer, their own telecom companies, in the UK these were ICL, Ferranti, Plessey, GEC, STC, all of the big markets were very much nationalistic. Everybody worked within their own market whereas the Americans didn’t. The Japanese weren’t really a huge player at that time.

"So, our market was tiny compared with the American market and it wasn't sustainable. All of the European semiconductor companies were finding it harder and harder to stay in business and they all relied upon government subsidy and support to maintain some level of presence. They were all losing money and it became a very difficult situation."

Malcolm highlights the European pioneers who in the early 1980s, decided "enough was enough." Pasquale Pistorio who took up a role to revive SGS after working in in Motorola for several years and later successfully merged SGS with France's Thomson Semiconductors, Juergen Knoor at Siemens and Kees Kreigsmann from Phillips.

Malcolm continues: "There was this groundswell of unrest in Europe of the industry leaders at that time, all wanting to do better. They got together, they started to cooperate with each other, informally in the beginning, because cooperation could be antitrust. The very first programme they did was the MEGA Project where they decided that Siemens would build a one megabyte DRAM, Philips did the one megabit SRAM, and SGS-Thompson did the one megabit EPROM electronically erasable memory. They worked together on doing that and that led to the formation of the Joint European Submicron Semiconductor Initiative (JESSI), which was an official programme under the EU.

"I helped them by organising a European semiconductor conference. I got together all of these leaders in the same room and we focused on how do we revive the European semiconductor industry. It was very, very successful and by the end of JESSI, Europe had caught up with the world in technology, and in fact, in certain sectors, they were ahead in technology, we had technology leadership."

Malcolm goes on to highlight that the success didn't last. Adding: "They caught up, they were really up there, all three of the major European manufacturers were in the top ten suppliers, but then we lost the plot completely and everything fell apart."

Y2K

On the subject of Y2K or the Millenium bug, Malcolm says: "I've always been fairly stoic about these things. People were overly aware of what might happen and they took extraordinary steps to try to stop it happening, but we all sat with bated breath at one minute to midnight on the year 2000, wondering what would happen when the next second passed by, and nothing of any real significance did. What it did was create a huge artificial surge in demand for electronics. It was a real boom year followed by a huge recession in 2001 because everybody had overstimulated their demand in the build up. It was an interesting part of the cycle."

On Intel and ARM

On the subject of Intel, Malcolm says: "Intel is not the company it used to be. Intel was a very strong engineering, manufacturing, ethos-driven company. It was never really a very good market-driven company. Their attitude to market was create as close a monopoly as they could

so that customers have no option but to go to them. They survived for years on that with their x86 type products.

“It's not my ideal way of doing business, I’m a more of a marketeering type of guy and I believe you fight your corner and you win it fairly and squarely. But they did come through with a reasonably good product line that delivered the goods, albeit, at an inflated price, when you compare it to what would be the cost of that when measured against the industry norms.

“We have a very basic norm for the industry, we work out simply what is the size of the semiconductor market overall and how many square centimetres of silicon is processed to support that market. The industry average is 9 dollars a square centimetre.

Interestingly, it’s been 9 dollars a square centimetre since the beginning of time. This is one of those really interesting statistics of the industry, even though we’ve had Moore’s Law enabling us to create more complex integrated circuits, the flip side is that you reduce the price of that integrated circuit on a fairly steep level. So, for every more complex chip you introduce, you have one chip of the same complexity you’re reducing the price on.

“When you look at Intel’s revenue per square centimetre, it was 100 dollars per square centimetre. Nine dollars is the average, analogue circuits were a little bit higher, microprocessors a little bit higher still, memory, a little bit lower, but 100 versus 9, that’s not normal. That was an extreme distortion, and to some extent, there was a bit of price gouging going on which we all knew about, but Intel could get away with it. Then they lost the plot by losing their edge on manufacturing and their ability to bring in new designs on their schedule.

“They’ve now got to catch up and catch-up is hard in this business. If you lose that leadership position, as a rule of thumb, it takes ten years to catch up. You’ve got to throw a lot of money at it because you’re chasing a moving target. You’re chasing the market leader and for every year you catch up, they move forward a year as well, so it’s two steps forward and one step back, it takes a long time to close that gap. You can close it but it does take a minimum of five years, more likely ten. It took Europe seven years to catch up with JESSI which was fast.”

“ARM did an amazing job, hats off to-to Sir Robin Saxby he was an awesome rock star when it comes to semiconductors, he did what had to be done. He was fighting the might of Intel, Motorola, National Semiconductor, of every manufacturer of microprocessors in the world, and he turned that little rinky-dink processor, designed in some rinky-dink company in the UK, into a world-class product, that became usable by everybody. To a certain extent, it was the right place at the right time, we all need a bit of luck, but Robin drove that through and got the whole concept of licencing onto the market. He turned ARM into a powerhouse.

“However, it also became their Achilles heel because they became king of the mobile era, but then lost and forgot about the other markets. When the mobile market plateaued and peaked out suddenly, ARM had to fight from the ground upwards against a fresh bunch of competitors, which is tough, for the new markets, the automotive markets, which we're also now starting to use core technologies. In my opinion, it’s not an industry opinion, it’s my own personal view, I think they made a huge mistake by backing what they called IoT.”

Mistakes

Of his mistakes, Malcolm says “Hanging onto things too long, is one of my biggest mistakes. It’s just human nature. It’s very hard to terminate something. I tend to be a little bit too romantic in that and a little bit less hard-nosed than perhaps I should be at times.

“I probably didn’t expand fast enough as well. I probably should have been more aggressive in the early days of Future Horizons but I tried not to over-extend myself in terms of getting into too much debt. I don’t regret it because my whole ethos in Future Horizons was to concentrate much more on the analytical side. I am much more interested in what does the number mean to me, what do the facts, the data mean to me. The same data point can mean diametrically different things to different people depending on where you are in that picture. I get a lot more satisfaction about sitting down with people, trying to help them understand what the data means to them, how can they use it, exploit it, position themselves to be in the right place when these trends are gaining some traction.”

Malcolm Penn

11 Apr 2022